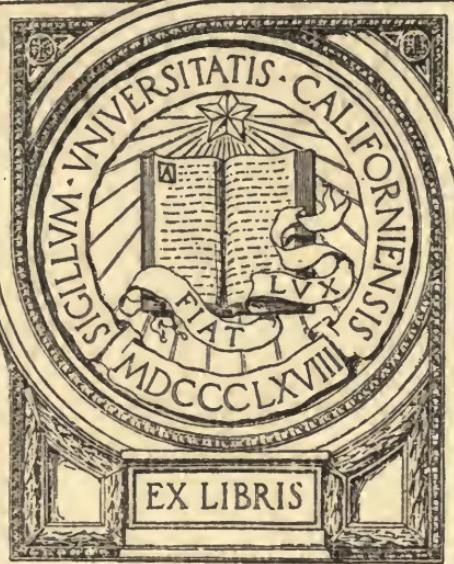


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Issued November 18, 1911.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS—CIRCULAR No. 48.

MILTON WHITNEY, Chief of Bureau.

SOILS OF THE EASTERN UNITED STATES AND THEIR USE—XXV.

THE ORANGEBURG FINE SAND.

BY

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WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1911.

ANNUAL REPORT TO THE SECRETARY OF AGRICULTURE
ON THE BUREAU OF SOILS.
FOR THE FISCAL YEAR 1900.

ANNUAL REPORT OF THE BUREAU OF SOILS

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SOILS OF THE EASTERN UNITED STATES AND THEIR USE—XXV.

THE ORANGEBURG FINE SAND.

GEOGRAPHICAL DISTRIBUTION.

The Orangeburg fine sand is found in 18 different soil-survey areas in 6 different States and has been mapped to the extent of 475,008 acres. Since only about one-seventh of the Coastal Plain area of the United States has yet been covered by soil surveys, it is probable that the total area of the type will ultimately aggregate 3,000,000 acres.

The Orangeburg fine sand has been encountered only in soil survey areas located within the Gulf Coastal Plain. No occurrences have yet been found within the Atlantic region. The type is most widely developed in northeastern Texas and northern Louisiana, and in southeastern Alabama, southwestern Georgia, and northern Florida. In the latter region it is found only in a belt near the Gulf, while in the former region the principal occurrences are at a considerable distance inland.

CHARACTERISTICS OF SOIL AND SUBSOIL.

The surface soil to a depth of 15 inches or more is a gray or brown fine sand or occasionally a fine sandy loam. This grades downward into a sticky, red, fine sandy loam which at greater depth becomes a sandy clay. The total depth of surface soil and subsoil is usually in excess of 40 inches.

The Orangeburg fine sand is easily distinguished from the Norfolk fine sand through the characteristic red color of its subsoil. It is apt to be confused with the soils of the Greenville series, which, by contrast, are red in both surface soil and subsoil, or with the Susquehanna fine sand, which, while similar in color, possesses a stiff, plastic clay subsoil as contrasted with the friable sandy clay of the Orangeburg fine sand.

SURFACE FEATURES AND DRAINAGE.

In practically all areas where it occurs the Orangeburg fine sand lies at a considerable elevation and is characterized by a rolling to sloping surface.

It frequently occupies the crests of ridges on the upland or adjacent to stream channels. Where the ridges are broad the surface of the type is undulating to rolling, but upon narrower ridges, and in all cases along the margins of the more elevated portions, the slopes to adjacent territory are liable to be steep and usually gullied. The depth of the surface fine sandy soil is usually greatest upon the crests of the ridges, while the sandy clay subsoil is encountered at shallower depths along the more gentle slopes. Outcrops of the subsoil where erosion has cut away the surface materials along the margins are frequent.

In the eastern Gulf region the Orangeburg fine sand lies at altitudes ranging from 100 to 250 feet above tide level. In the western Gulf region it is usually found at altitudes between 150 feet and 500 feet, where it is usually more rolling and frequently occurs in large areas upon the elevated uplands.

Owing to the sandy texture of the soil, to its elevated position, and to its rolling surface features, the Orangeburg fine sand is well drained, with a tendency toward excessive drainage upon the crests of ridges, especially where the surface soil has a depth greater than 2 feet. Upon the more gentle slopes the soil is less droughty and better suited to the production of general farm crops. Only a few level areas, somewhat depressed below the general elevation of the greater portion of the type, are poorly drained.

The same factors which furnish excellent drainage also favor the excessive erosion of the type. Although the soft, permeable surface soil readily absorbs a large proportion of the moisture which falls upon it, yet its incoherence and its elevated position favor rapid erosion. The steeper borders of the type are badly eroded, where deep gullies are being cut back from the major stream channels into the more elevated uplands and where the steep gradient favors the rapid removal of the fine-grained incoherent material of the Orangeburg fine sand. Upon the more gently rolling or undulating areas of the type, erosion is scarcely perceptible, although there is a tendency toward the constant removal of fine sand from higher altitudes to lower and more level areas. In general the Orangeburg fine sand is either too steeply sloping to justify cultivation, or the more level, cultivable areas are little susceptible to destructive washing.

LIMITATIONS IN USE.

The principal limitation in the use of the Orangeburg fine sand arises from the sandy texture and considerable depth of the surface soil. While a considerable proportion of the total rainfall penetrates the surface soil and is readily absorbed, yet the depth to the clay subsoil permits of rapid downward percolation, causing the surface to dry rapidly even after heavy rains. As a result the type must be

carefully handled in all of the tillage operations to the end that the largest possible amount of soil moisture may be retained in the surface zone for the use of crops, especially during the latter portion of the growing season.

Where such tillage methods are employed the staple farm crops of the region may be grown to fair advantage, but without these precautions the type is somewhat too well drained to constitute a general-purpose soil of the highest value. It may thus be ranked as a fair general farming soil, but one somewhat better suited to the production of vegetables and fruits, which require a well-drained, warm, and easily tilled seed bed.

Because of its sandy character there is a constant tendency with the Orangeburg fine sand toward the complete oxidation and destruction of the organic-matter content. This has been emphasized in many areas through the constant planting of the type to intertilled crops, with little or no attempt to produce green crops for the purpose of incorporating organic matter in the surface soil. As a result all of the fields which have been tilled for any considerable period of time are somewhat deficient in organic matter, as is shown by the light-gray color of their surfaces, while in extreme cases of destructive one-crop tillage the efficiency of the soil has been so impaired that after 8 to 10 years of cultivation the organic matter has been almost completely eliminated and the general farm crops are no longer profitable. This process of taking up new land, of tilling it until the organic matter is destroyed, and of abandoning the fields for other new land is a common pioneer method in regions where land is cheap and where careful tillage, crop rotation, and the restoration of organic matter are not rendered necessary through lack of available land.

The largest areas of the Orangeburg fine sand occur in territory but recently cleared of its pine timber and in pioneer communities where careful rotation of crops and the restoration of organic matter have not been prevalent. As a result the type has suffered materially under these methods of occupation, and its true value either as a general or special purpose soil is frequently not appreciated. Excessive erosion in numerous areas interferes seriously with the production of many farm crops upon this soil. In general the surface conditions of the Orangeburg fine sand permit of its rough classification into two classes of land so far as erosion conditions are concerned. Upon the one hand lie the steep slopes from the upland to adjacent streams, where the declivity is greater than 10° or 15° and erosion is always active, especially during the heavy winter and spring rains. These slopes are too steep for cultivation and should never be included within the tilled areas. On the other hand are the undulating to rolling upland portions of the type, with slopes of less

than 10° , which may well be occupied for the production of general and special crops, provided slight precautions are taken to prevent the too rapid run-off of the heavier rains. Thus, in areas topographically suited to cultivation, the Orangeburg fine sand is well drained and only moderately susceptible to erosion, in sharp contrast with the steeper slopes where erosion is a constant menace and where reforestation is practically the only preventive of further destruction.

The gullies along the margins of the type constitute the chief obstructions to complete tillage. The land is stone free, the greater portion of the type is moderately sloping, and the soft surface soil is easily tilled.

Practically all of the area of the Orangeburg fine sand thus far encountered lies within the warm, temperate region of the Gulf States, and principally within areas having a moderate to heavy rainfall. Climatically the type is suited to the production of all crops of the Southern States with the exception of those which are restricted to frost-free territory. At the same time, the portions of the type lying at the higher altitudes and along the northwestern border of the Coastal Plain are also adapted to the production of many crops common to more northern communities. The Orangeburg fine sand has a wide range in crop-producing capacity, which will be discussed in detail under another head.

IMPROVEMENT IN SOIL EFFICIENCY.

Owing to the textural peculiarities of the type, improvements in its crop-producing efficiency may best be attained through the employment of those tillage methods leading to the retention near the surface of larger amounts of soil moisture. Most important of these is the restoration of organic matter to the surface soil. Originally covered chiefly by pine forest, the vegetable litter accumulated in relatively small quantities in this type and was found at shallow depths within the surface soil of the type. With the cutting of the timber and the occupation of the land for agricultural purposes, chiefly for the production of cotton year after year, the organic matter was rapidly destroyed and over thousands of acres of the type the pale, gray, sandy soil is apparently exhausted of its humus.

As this exhaustion progressed crop yields deteriorated, and in many instances only three or four crops of cotton were produced before the land was thrown out and other areas planted to cotton or to corn. Even under somewhat better conditions of agricultural occupation the organic matter content in the surface soil has frequently been exhausted within 8 or 10 years of the first occupation of the land. Throughout practically the entire area where the type occurs little or no effort has been made toward the restoration of this organic matter, although its incorporation in the surface

soil is of fundamental importance if the type is to be occupied permanently for general farming. Excellent green manuring crops, such as cowpeas, velvet beans, winter vetch, and crimson clover, may all be grown upon the Orangeburg fine sand. The use of one or more of these crops annually should be included in the general rotation schemes to be practiced in the tillage of the type. After a few years of persistent effort in this respect the original productiveness of the soil may be restored and frequently surpassed throughout the greater portion of the area occupied by the type. Even winter oats or winter rye, used as cover and green-manuring crops, constitutes a vast improvement over the present system of clean tillage, no winter cover crop, and no organic manure.

Special methods of tillage should also be employed in conjunction with the restoration of organic matter. Every effort should be directed toward the packing of the subsoil immediately below plow depth. For this purpose shallow plowing is particularly recommended. The soil is sufficiently well drained, so that it is not usually necessary to throw up ridges upon which the cotton or corn may be planted. Shallow broadcast plowing should be the general rule, to be followed immediately by the harrowing of the surface soil, lest much needed soil moisture should evaporate rapidly from the freshly plowed surface.

After the cotton or corn crop has been planted the frequent shallow tillage of the soil is necessary. For this purpose the spike-toothed cultivator, the weeder, and the sweep are superior to the small turn plow or the shovel cultivator. It is only necessary that the surface earth should be stirred to a depth of about $1\frac{1}{2}$ inches in order to maintain a dry dust mulch which will largely prevent excessive evaporation. Only in extreme cases where the grass has secured an unusual headway among the tilled crops should the turn plow be used.

The gently sloping, stone-free character of the surface of the Orangeburg fine sand, together with its incoherent, soft texture, favor the more general use of the disk plow, the disk harrow, and the disk cultivator. With such implements the trash and weeds of the preceding year may be thoroughly broken down and incorporated with the surface soil, aiding in the maintenance of the organic matter content. At the same time the soil is sufficiently stirred to an even depth and the surface of the land left comparatively level, presenting the least possible surface for evaporation. The rate at which land may be prepared by the disk machinery considerably exceeds that possible by the use of the turn plow and the ordinary cotton-field implements. A larger proportion of the work of preparing the land may also be performed by horse power, with a consequent reduction in the expenditure for human labor.

The fertilization of the Orangeburg fine sand differs somewhat from that of other upland cotton soils. Wherever possible all stable

and yard manures should be saved and applied to this type, or to similar sandy soils upon the farm. Cottonseed meal, to the amount of 500 pounds or more per acre, should be applied in conjunction with the usual commercial fertilizers. Although the practice with regard to the use of chemicals varies considerably in the different areas where the type is found, in general those farmers securing the largest yields of cotton from the Orangeburg fine sand are the ones who fertilize heavily with a mixture which will analyze about 8 per cent of phosphoric acid, not less than 2 per cent of nitrogen, and from 6 to 10 per cent of potash.

Very few commercial fertilizers ordinarily sold for cotton growing contain such a large amount of potash, and it is frequently necessary for the progressive farmer to buy potash salts to be used in conjunction with the more ordinary brands of cotton fertilizer. The nitrogen should be supplied chiefly through the production of leguminous crops, such as cowpeas, velvet beans, winter vetch, and crimson clover. Where necessary, cottonseed meal may be used directly in conjunction with the mineral fertilizers. In all instances care should be taken to furnish adequate amounts of nitrogen and of potash in the fertilization of this type. Smaller amounts of the mineral fertilizers will ordinarily be required where the organic-matter content of the surface soil is high, while satisfactory crops may only be secured upon areas low in organic content through the abundant use of the mineral fertilizers.

LIMITATIONS UPON SPECIAL CROPS:

The Orangeburg fine sand, where it is properly located with regard to transportation facilities, is well suited to the production of quite a variety of market-garden vegetables and small fruits. The climatic surroundings and its inherent characteristics of texture, structure, and drainage render it suitable for medium to early truck crops in practically all areas where it is found. In northeastern Texas and in northern Louisiana the truck industry is rapidly being extended upon this soil type. In the more eastern States only occasional areas have been devoted to this form of farming. There is a considerable opportunity for the extension of vegetable and fruit culture upon this type.

Like the Orangeburg sandy loam and the Orangeburg fine sandy loam, this type is fairly well suited to the production of Cuban cigar-filler tobacco. Owing to the considerable depth of sandy surface soil, yields are frequently less than upon the other two types mentioned. Satisfactory crops, however, may be grown if attention is paid to bringing the land into good condition before the crop is planted, chiefly by the incorporation of organic matter in the surface soil, coupled with careful tillage during the earlier part of the growing season.

In northern Louisiana and northeastern Texas the Orangeburg fine sand constitutes one of the best of the extensively developed peach soils. Its location upon the higher ridges, its rolling surface, its deep sandy surface soil, the excellent air and water drainage, and the presence of the sandy clay subsoil serving to store sufficient moisture to promote continued tree growth are all conditions favorable to peach orcharding. The Elberta variety is particularly well suited to the climatic conditions under which the Orangeburg fine sand occurs most extensively and is the variety principally planted, although others are successfully grown. Care should be taken that areas selected are not threatened by excessive erosion nor so level as to give rise to stagnation of water within either surface soil or subsoil.

For the vegetables and small fruits, those areas of the type which possess a deep fine sand or fine sandy loam surface soil should be chosen. If the depth equals or exceeds 24 inches the earliest crops may be grown, while even upon the average of the type fairly early vegetable crops may be secured. For the production of early Irish potatoes, sweet potatoes, cantaloupes, and tomatoes the Orangeburg fine sand is probably excelled only by the Norfolk fine sand within the Gulf Coastal Plain region.

EXTENT OF OCCUPATION.

In general the Orangeburg fine sand has only been partially occupied for agricultural purposes. In the more western communities the land has but recently been cleared of forest and is only now being utilized for the production of annual crops. In many more eastern localities the areas of the Orangeburg fine sand are exceeded in extent by other types of the same and associated series which are even better suited to the growing of cotton and of corn. It is only where the most improved methods of agriculture are being introduced or where the value of the type for the production of special crops is appreciated that the Orangeburg fine sand has been fully occupied and developed either as a general farming or as a special crop soil. In consequence there are thousands of acres of the type still awaiting occupation and development, particularly in regions west of the Mississippi River. In some instances additional transportation facilities must be supplied before this occupation can be extended, though in most cases a proper appreciation of the best methods of tillage and of the best crop adaptations would lead to a greater demand for this soil.

CROP ADAPTATIONS.

Cotton is the principal crop grown upon the Orangeburg fine sand. It is more resistant to drought than corn and is usually preferred as the money crop of the entire region within which this type is found. The yields secured are extremely variable. Upon the deeper, more

sandy areas, especially where the crop has been grown for many years in succession with an almost complete exhaustion of the organic matter in the surface soils, they are frequently less than two-fifths of a bale. Upon newer land or upon land more rationally cultivated and better fertilized the Orangeburg fine sand produces from one-half to two-thirds of a bale of middling Upland cotton. These yields are exceeded by the best farmers, who have become familiar with the peculiarities of the type and who appreciate the advantages to be derived from the growing of leguminous green manuring crops and the use of considerable amounts of high-grade fertilizer.

To secure the best results from cotton on the Orangeburg fine sand it is requisite that organic matter should be continuously restored to the surface soil between periods of cropping. For this purpose the leguminous crops, cowpeas, soy beans, velvet beans, the vetches, and crimson clover are by far the best, although winter oats and winter rye may be used where difficulty is experienced in securing a stand of the other crops. The partially grown green manuring crop which has occupied the land during the fall and winter months should be turned under to a depth of 3 or 4 inches in the early spring, and where possible the land should be heavily limed with burned stone lime two weeks before the planting of the succeeding crop.

Under the climatic conditions prevalent where the type is most extensively developed, the use of lime is found to be decidedly advantageous in promoting the decomposition of the heavy growths of the green manuring crops. When its use is not resorted to, some difficulty is frequently encountered through the fact that the green manure is not sufficiently decayed at the time the money crop is planted and its immediate benefit is lost.

The cotton, and, likewise corn, should be frequently intertilled throughout all of the earlier period of the growing season. This is necessary, not merely for the destruction of weeds and for the aeration of the soil, but also in order that a surface dust mulch may be formed which is interposed between the moist underlying soil and the evaporation processes of the air above. Particularly during the latter part of the tillage season should the cultivation be shallow, in order that the feeding roots of the cotton or the corn may not be broken, as would happen with deeper cultivation. These two methods of soil management are particularly requisite for the production of satisfactory crops of cotton or of corn upon the Orangeburg fine sand.

Corn is less generally grown than cotton upon the type. It is less able to withstand drought and is consequently grown either upon bottom lands or upon other types naturally better suited by texture or by topographic position to retain soil moisture into the later summer months. The yields of corn upon the Orangeburg fine sand are generally low, ranging from 8 or 10 to 12 or 15 bushels per acre,

although these yields are readily doubled through the adoption of proper methods of green manuring and of tillage, such as have been outlined for growing the cotton crop. Usually corn might better be produced upon the Orangeburg fine sandy loam, the Orangeburg clay, or some other more retentive type of soil generally associated with the Orangeburg fine sand.

Winter oats are grown to a limited extent upon this soil. The yields are low, partly because of insufficient preparation of the land, and partly because the crop is not particularly well adapted to such a sandy soil. The oats are either grazed off during the winter or cut for hay in the spring or early summer.

Truck crops.—The Orangeburg fine sand ranks next to the Norfolk fine sand as the best medium to early trucking soil in the Gulf coast region. Owing to its more extensive development in the western Gulf region it is there the dominant trucking soil. The type possesses the principal requisites for forcing garden vegetables and small fruits to early maturity. It is porous, well drained, warm, and easily tilled, and considerable proportions of the type are sufficiently level to permit of complete occupation for gardening purposes. Those portions of the type which possess 24 inches or more of the surface fine sand or fine loamy sand overlying the sandy clay subsoil are the warmest and earliest, and therefore best suited for trucking, although the general average of the type is fairly well suited to such uses.

The principal truck crops grown are early Irish potatoes, sweet potatoes, watermelons, cantaloupes, tomatoes, and strawberries. The type is the best cantaloupe soil to be found in the Western Gulf States.—It is almost equally well suited to watermelon growing, although the Orangeburg sandy loam is fully as well suited to the production of the latter crop. It is one of the best sweet potato soils either for the production of the potatoes as an early trucking crop or for the standard, staple supply for local use. Tomatoes are grown not only for shipment in baskets to the northern and western markets, but also in some localities for canning purposes.

There are several important trucking crops which are not yet generally grown upon the Orangeburg fine sand, but which might be introduced to advantage. Among these, early garden peas, snap beans, cucumbers, and asparagus are probably best suited to the type.

In practically all instances where the Orangeburg fine sand is to be utilized for market-garden purposes it will be necessary to obtain large amounts of stable manures for the proper preparation of the land. The experience of the Atlantic coast trucking districts has demonstrated that upon a similar soil type, the Norfolk fine sand, continued success in the trucking business is largely dependent upon stable manure from city sources. For the majority of crops the

stable manure is applied in a deep trench thrown open for that purpose. After the manure is placed in the bottom of the trench, a thin covering of the soil from the sides of the trench is thrown upon it. Upon this soil covering any commercial fertilizer, selected by the grower, is applied, and the crop is later planted. During this process of preparation the earth is worked back over the manure until a low ridge is formed.

Interplanting of crops and successive plantings of crops maturing at different seasons enable the experienced trucker to get the full benefit of this intensive form of land preparation, and not infrequently land which is planted to such crops as early peas or beans may again be prepared, after the removal of the trucking crop, and a standard crop of potatoes, tomatoes, or other vegetables grown during the same season. Thus the benefits of the heavy application of stable manure are secured throughout the year upon successive crops. Some truckers habitually follow the early vegetable crop with a crop of cowpeas, to be used for forage purposes. In such instances a considerable restoration of organic matter to the soil is accomplished through the plowing under of the roots and stubble of the cowpea crop, thus lessening the amounts of organic manures which must be purchased.

Fruit crops.—Peaches are the most important fruit grown upon the Orangeburg fine sand. The orchard sites must be selected with care. Consideration must be given not only to the internal drainage of the soil and subsoil but also to the elevation and surface configuration of the field, in order that proper exposure and slope may be secured to insure good air drainage. The slope must not be too steep, otherwise erosion is liable to become a serious problem. Low rolling ridges are best suited to peach orcharding, where the surface sandy soil is sufficiently loose, warm, and dry to promote the rapid growth of the trees during the first years after planting. The same factors also favor the production of a highly colored and flavored fruit. The sandy clay subsoil is at the same time sufficiently near the surface to permit of the penetration of the deeper tree roots, insuring long-continued tree growth and an adequate moisture supply during the annual period of wood growth and of fruiting.

Plums are being planted extensively in the northeast Texas region upon the Orangeburg fine sand, with reasonably successful results. It is probable that grapes would also do well if varieties suited to southern climates should be set upon this type.

Special crops.—The introduction of the Cuban type of cigar filler tobacco into the Gulf portion of the United States has led to experimentation with various soils to determine which are best suited to its production. Thus far the soils of the Orangeburg series have proven themselves superior to any others for this type of tobacco.

It is probable that the Orangeburg fine sandy loam and Orangeburg sandy loam are about equally well suited to the cigar filler tobacco, giving large yields of good quality and excellent aroma. The yields upon the Orangeburg fine sand are not so large, but the quality of the tobacco is equally as good as upon the other two soil types of the series. For tobacco culture those portions of the type where the sandy clay subsoil is found within 12 to 15 inches of the surface should be selected. It is essential also that considerable attention be paid to the restoration of organic matter to the surface soil before tobacco planting upon the type is attempted. The thorough preparation of the land, its heavy fertilization, and constant, careful tillage of the crop are all essential to profitable tobacco growing. If possible the crop should be grown either upon the sandy loam or the fine sandy loam, although it may be produced upon the Orangeburg fine sand.

FARM EQUIPMENT.

In regard to their farm equipment the different areas of the Orangeburg fine sand are identical with associated types. In the older settled districts this is usually adequate for the tillage of a loose, easily stirred surface soil, for the housing of the work stock, and the storage of the small amount of forage annually produced upon each farm. In more recently settled communities the equipment is necessarily less elaborate than in the eastern and longer settled districts. It is probable that considerable improvement in tillage would be secured if better farm implements, particularly the disk tillage machinery, should be generally introduced upon the type. The small turnplow in common use in the section where the type occurs is poorly adapted to bring out the best qualities of this soil. Neither in the original preparation of the land nor in its subsequent cultivation is the turnplow as effective as disk machinery, spiked-tooth harrows, and the cultivator and weeder.

SUMMARY.

The Orangeburg fine sand is an important soil type occurring almost exclusively in the Gulf Coastal Plain region and developed to the widest extent in northern Louisiana and northeastern Texas.

It is rolling to somewhat hilly in its surface configuration and in consequence of its topographic features and sandy texture is always well drained.

The type is subject to excessive erosion in some areas, particularly where the upland portions break down with sharp slopes toward the major stream drainages.

The Orangeburg fine sand is a fair cotton soil. It is not so well suited to the production of corn and winter oats, which, with cotton, constitute the staple crops.

The type is also well suited to the production of medium and early truck crops, especially watermelons, cantaloupes, early Irish potatoes, sweet potatoes, tomatoes, and strawberries.

Peaches and plums are also grown to advantage on the Orangeburg fine sand.

The Cuban cigar filler tobacco is the most important special crop adapted to this type.

For improvement in soil efficiency the first need is the restoration of organic matter to the surface soil, which may be accomplished through the growing and turning under of cowpeas, velvet beans, winter vetch, or crimson clover. Winter oats or rye may be used for this purpose, though not to as good advantage.

The shallow plowing of the soil and frequently shallow intertillage of the crop are necessary to aid in the maintenance of a sufficient supply of moisture during the latter part of the summer.

Considerable areas of the Orangeburg fine sand have recently been cleared of their forest growth and are awaiting agricultural occupation.

Approved.

JAMES WILSON,

Secretary of Agriculture.

WASHINGTON, D. C., September 26, 1911.

APPENDIX.

The following table shows the extent of the Orangeburg fine sand in the areas surveyed to this time.

In the first column is stated the particular soil survey in which the soil was encountered; in the second column its extent of development in acres; and in the third column the volume of the Field Operations of the Bureau of Soils in which the report upon the area may be found. Those desiring a detailed description of the soil and of the general conditions which surround it in any particular area may consult these volumes in almost any public library.

Areas of the Orangeburg fine sand encountered in the soil survey.

Survey.	Area of soil.	Year of publication, Field Operations.	Survey.	Area of soil.	Year of publication, Field Operations.
Alabama:					
Butler County.....	Acres. 34,304	1907	Mississippi: Jasper County...	Acres. 2,304	1907
Coffee County.....	5,120	1909	Texas:		
Dallas County.....	13,312	1905	Bastrop County.....	11,904	1907
Florida: Marianna area.....	1,728	1909	Henderson County.....	110,400	1906
Georgia:			Houston County.....	704	1905
Grady County.....	7,936	1908	Lee County.....	69,696	1905
Thomas County.....	28,032	1908	Robertson County.....	8,000	1907
Louisiana:			San Antonio area.....	36,736	1904
Bienville Parish.....	10,880	1908	Wilson County.....	49,408	1907
Caddo Parish.....	27,264	1906			
Lincoln Parish.....	30,208	1909			
Winn Parlish.....	27,072	1907			

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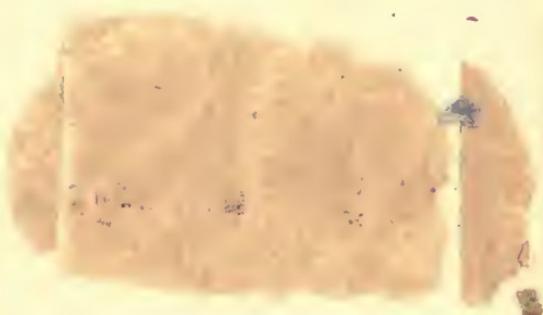
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